4.4 AIR QUALITY

For the Chevron El Segundo Marine Terminal Lease Renewal Project (Project), this section describes the environmental and regulatory settings related to air quality in the Project area; identifies air quality impacts of the proposed Project, alternatives, and cumulative projects; and provides potential mitigation measures.

4.4.1 Environmental Setting

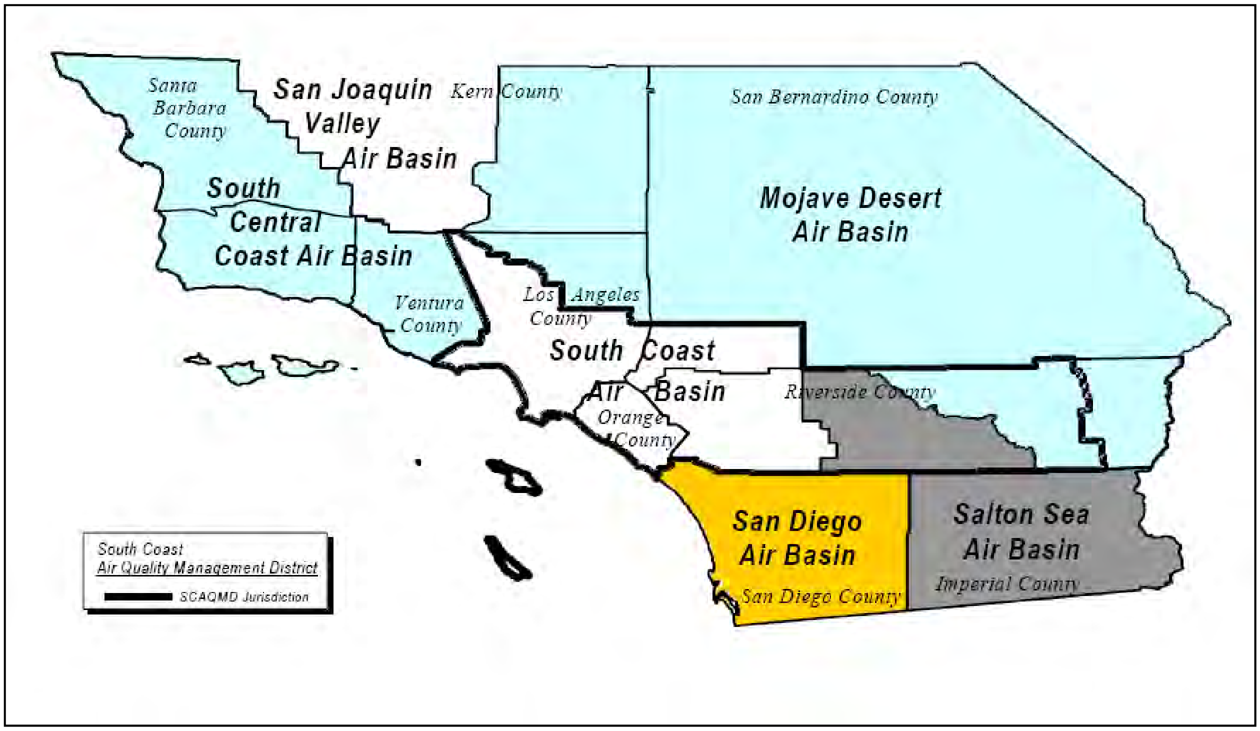
Regional Climatology

California is divided into air basins, which are served by either individual or multi-county air pollution control districts (APCD) or air quality management districts. The Marine Terminal and Refinery are within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD consists of the South Coast Air Basin (SCAB), which includes portions of Los Angeles, Riverside, and San Bernardino Counties and all of Orange County. Within Riverside County, the district also has jurisdiction over portions of the Salton Sea Air Basin and the Mojave Desert Air Basin. Figure 4.4-1 shows the SCAB, which is bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east.

A semi-permanent, subtropical, Pacific high-pressure system dominates the vicinity of the project site. Generally mild, cool sea breezes temper the climate; nonetheless, periods of extremely hot weather, passing winter storms, or dry offshore Santa Ana winds occasionally interrupt the mild climate.

Winters are seldom cold, frost is rare, and minimum temperatures average between 40 and 50 degrees Fahrenheit (°F) (4.4 and 10 degrees Celsius [°C]). Spring days may be cloudy because of high fog. Rainfall averages about 13 inches (25.4 centimeters [cm]) per year, falling almost entirely from late October to early April. Temperature (mean, maximum, and minimum) and precipitation data from the Los Angeles International Airport (LAX) indicate the historical meteorological profile of the area in the vicinity of the Marine Terminal. Table 4.4-1 presents these data.

1 **Figure 4.4-1**
2 **SCAQMD Jurisdiction**



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4 Source: SCAQMD 2007

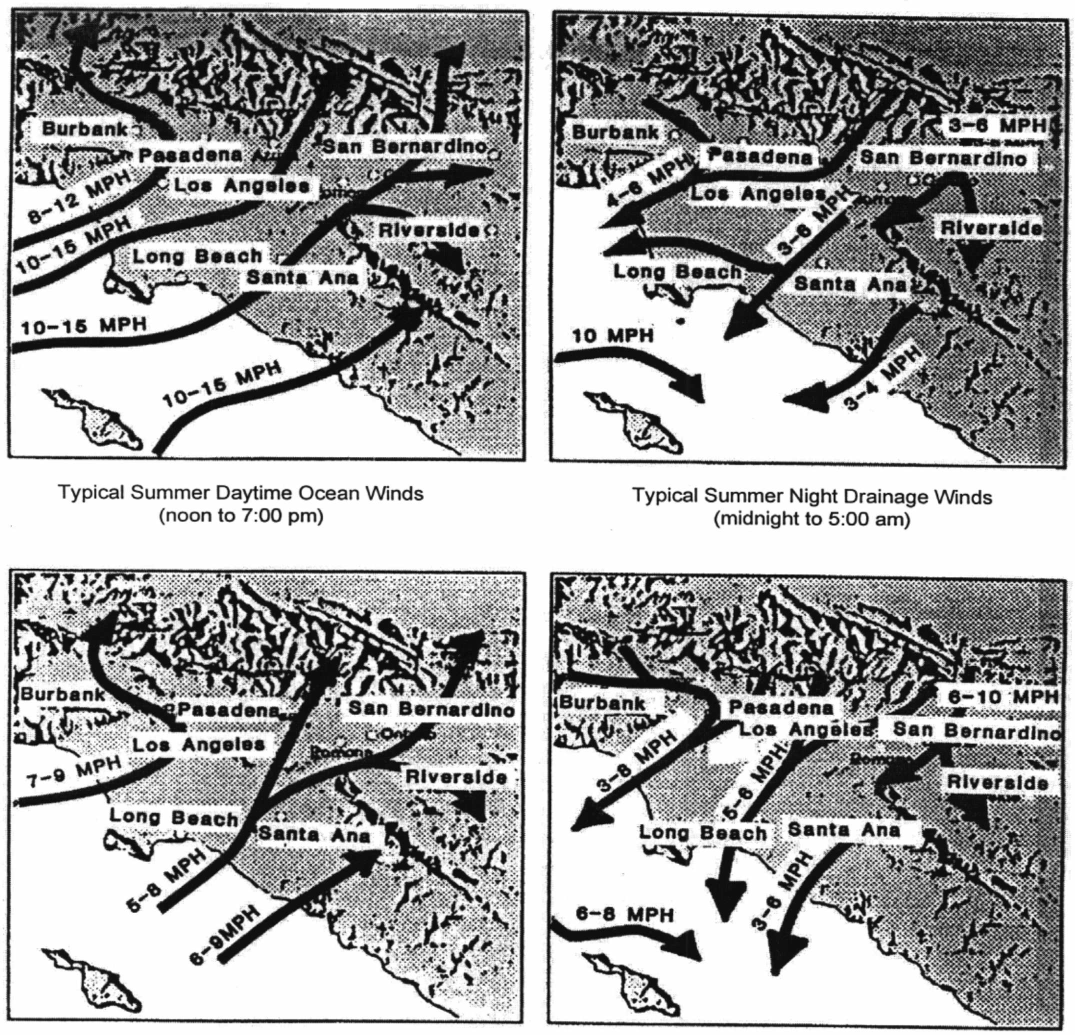
Table 4.4-1
Average Monthly Temperatures and Precipitation at LAX
1939-1978

Month	Mean Monthly Temperatures		Total Precipitation (inches)
	Maximum (°F)	Minimum (°F)	
January	66	49	3.0
February	66	50	3.1
March	65	51	2.4
April	68	54	0.6
May	69	57	0.2
June	73	60	0.08
July	75	63	0.03
August	77	65	0.1
September	77	64	0.3
October	74	59	0.4
November	70	53	1.1
December	67	49	1.8
Annual Average	71	56	13.2
Absolute extreme temperatures	110	27	

Source: NCDC 2004

Seasonal and diurnal wind regimes affect air transport in the vicinity of the Marine Terminal. Diurnal sea-breeze drainage flow typically dominates the local wind pattern with the onshore winds split by the Palos Verdes hills unless the marine layer is very deep. Figure 4.4-2 shows typical winter and summer seasonal wind patterns in the morning and the afternoon in the Basin.

Figure 4.4-2
Dominant Wind Patterns in the Basin



Typical Summer Daytime Ocean Winds (noon to 7:00 pm)

Typical Summer Night Drainage Winds (midnight to 5:00 am)

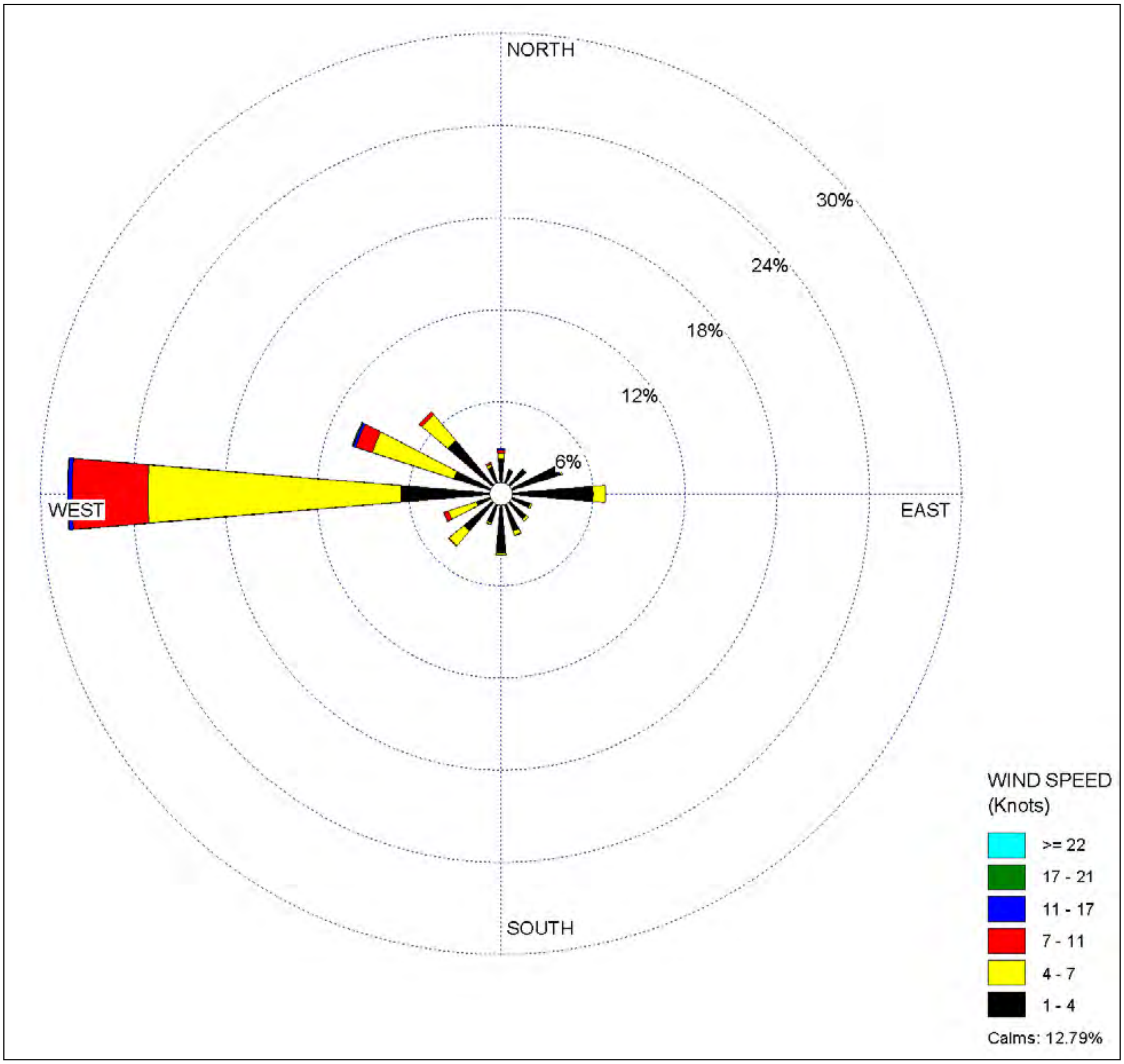
Typical Winter Daytime Ocean Winds (noon to 7:00 pm)

Typical Winter Night Drainage Winds (midnight to 5:00 am)

Source: SCAQMD 2006

A wind rose, like the one in Figure 4.4-3, depicts the frequency of the annual average wind speeds by direction. Figure 4.4-3 shows an annual wind rose for Lennox, an unincorporated community approximately five miles (eight kilometers [km]) northeast of the Marine Terminal shoreline facilities.

Figure 4.4-3
Lennox Station Annual Wind Rose



Note: Wind direction is the direction from which the wind is blowing
Source: SCAQMD 2009, Lennox ASC data file 1981

Normally, the temperature of the atmosphere decreases with altitude. The phenomenon of temperature increase with altitude is an inversion. An inversion condition can exist at the earth's surface or any height above the ground. The height of the base of the inversion often corresponds to the mixing height. Usually, the mixing height increases throughout the morning and early afternoon because the sun warms the ground, which in turn warms the adjacent air. As this warm air rises, it erodes and raises the base of the inversion layer. If enough surface heating takes place, the inversion layer breaks and the surface air layers can mix upward essentially without limit. The SCAQMD is characterized by frequent, strong, elevated inversions. These inversions, created by atmospheric subsidence, severely limit vertical mixing; therefore, they promote the buildup of pollution, especially in the late morning and early afternoon.

Existing Air Quality

Pollutants that impact air quality are generally divided into two categories—criteria pollutants regulated health-based ambient standards and toxic air contaminants, which cause cancer or other adverse chronic or acute human health effects.

Criteria Pollutants

Comparisons of contaminant levels in ambient air samples to national and state standards determine whether a region's air quality is healthful or unhealthful. The U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) set these standards to protect public health and welfare with an adequate margin of safety. The Federal Clean Air Act of 1970 first authorized National Ambient Air Quality Standards (NAAQS). The State legislature authorized California Ambient Air Quality Standards (CAAQS) in 1967.

State and Federal health-based air quality standards in California regulate the following criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. The CAAQS are more stringent than the Federal standards (NAAQS). California also regulates sulfate, visibility reducing particles, hydrogen sulfide (H_2S), and vinyl chloride. However, H_2S and vinyl chloride are currently not monitored in the SCAQMD because these contaminants are not common air quality problems in the basin. CAAQS and NAAQS for each of these pollutants and their effects on health are summarized in Table 4.4-2.